

GOAL 8: SOUND SCIENCE, IMPROVED UNDERSTANDING OF ENVIRONMENTAL RISK, AND GREATER INNOVATION TO ADDRESS ENVIRONMENTAL PROBLEMS

EPA will develop and apply the best available science for addressing current and future environmental hazards, as well as new approaches toward improving environmental protection.

PROGRESS TOWARD THE STRATEGIC GOAL AND OBJECTIVES

EPA continued to address current and future environmental challenges in FY 2002 by developing the best available science and adopting new and innovative approaches for environmental protection. Specifically, the Agency completed an analysis of acid deposition trends in U.S. lakes and streams that provides evidence of the success of current environmental policies and contributes to the scientific understanding needed to maintain and restore these highly valued ecosystems.¹ The development of new methods to assess pesticide-related health impacts in young children similarly strengthens the Agency's ability to effectively prevent and manage risks to human health, particularly for those most susceptible to the effects of environmental contaminants.² Improved methods for quantifying mercury emissions from man-made sources and other research to reduce and prevent environmental and human exposure to endocrine disruptor chemicals (EDCs), mercury, and biological agents will enhance EPA's ability to anticipate and respond to environmental challenges.³

Environmental decision makers also have access to improved pollution prevention tools and technologies, including software to evaluate the inhalation impacts of metal finishing facilities on workers and nearby residents and protocols to verify the performance of new pollution prevention technologies with applicability to multiple economic sectors.⁴ In FY 2002 EPA continued to encourage the use of expert review and collaborative partnerships to ensure the

highest level of quality in its work. Building on its scientific, economic, and regulatory research and analysis activities, EPA is making environmental protection more flexible, efficient, and effective, while minimizing the burden on the regulated community.

FY 2002 PERFORMANCE

Sound Science

The American public, EPA, Congress, and the research community have expressed growing concern about the effects of acidic deposition on the lakes and streams of the United States. Title IV of the Clean Air Act Amendments sets target reductions for sulfur and nitrogen emissions from industrial sources as a means of reducing the acidity of deposition and thereby improving the biological condition of surface waters. In FY 2002 EPA produced a report⁵ on trends in acid deposition and the acidity of lakes and streams in the Northeast, mid-Atlantic, and upper Midwest regions of the United States. The report provides evidence that acid deposition controls are working. Researchers found that all regions except the Blue Ridge area have experienced significant declines in sulfate concentrations in surface waters, consistent with a decline in sulfate precipitation. Nitrate concentrations decreased in two regions. The highest nitrate concentrations were found in the Adirondacks and northern Appalachian plateau; however, acid-neutralizing capacity increased in the Adirondacks, northern Appalachian plateau, and upper Midwest, and modest increases in neutralizing capacity have reduced the number

of acidic lakes and streams in some of these regions. For example, the number of acidic lakes in the upper Midwest fell from 251 to 80 between 1985 and 2001. Acid-neutralizing capacity is a key indicator of recovery because it reflects the capacity of watersheds to buffer inputs of acidity. The National Acid Precipitation Assessment Program (NAPAP) will include the results of this analysis in its report to Congress and will be available at <http://www.oar.noaa.gov/organization/napap.html>.

Another significant FY 2002 achievement involved the completion of a framework that provides the Agency with the necessary components to determine the routes, magnitude, and variability of human exposures to various multimedia pollutants (e.g., pesticides, air toxics, metals). Through the framework, EPA will advance the science of human exposure and dose assessment by helping to answer key questions regarding pollutants that pose significant risk to children and other susceptible subpopulations. In response to recommendations from the Science Advisory Board (SAB),⁶ EPA also completed analyses of the National Human Exposure Assessment Survey,⁷ a program investigating critical information gaps about population-scale distributions of human exposures to contaminant mixtures. These analyses provide aggregate exposure data to evaluate many multimedia and media-specific risk management issues and to improve exposure methods and models.

EPA developed two new protocols for use in the Agency's endocrine disruptors screening and testing program, which were authorized by the Food Quality Protection Act of 1996⁸ and the Safe Drinking Water Act Amendments of 1996.⁹ The protocols will help EPA identify areas in which technologies can be applied to reduce and/or prevent human and environmental exposure to endocrine disruptor chemicals. In addition, EPA improved methods for quantifying mercury emissions from manmade sources. In FY 2002 the Agency produced a report¹⁰ (<http://www.epa.gov/appcdwww/aptb/EPA-600-R-01-109corrected.pdf>, appendix: <http://www.epa.gov/appcdwww/aptb/EPA-600-R-01-109A.pdf>) on the parameters that affect

both the species of mercury in coal-fired utility boiler flue gas and the performance of promising mercury control technologies. This report will be used to help plan future research needed to outline, by December 2003, the Maximum Achievable Control Technology Requirements. This work supports EPA's December 2000 decision to regulate mercury emissions from coal-fired electric utility steam-generating plants. Releasing about 43 tons of mercury each year, coal-fired power plants are the largest source of human-caused mercury emissions in the United States. EPA has found that there are cost-effective ways of controlling mercury emissions from power plants.¹¹ Technologies available today and technologies expected to be available in the near future can eliminate most of the mercury from utilities at a cost far lower than 1 percent of utility industry revenues.

In the area of pollution prevention research, EPA developed improved pollution prevention tools, including (1) computer software that can estimate the potential environmental impact of chemical process designs, (2) a pest resistance management framework to delay or prevent the emergence of resistance in target insects to the toxins in transgenic crops, and (3) software to evaluate the inhalation impacts of metal finishing facilities on workers and nearby residents. Industry and state and local decision makers can use these tools to evaluate pollution levels, impacts, and costs of product, process, or system redesigns that will in turn inform decisions that better protect human health and the environment. In addition, EPA's Environmental Technology Verification program completed 20 stakeholder-approved and peer-reviewed testing protocols for commercially ready environmental technologies in 6 categories (environmental monitoring, air pollution control, drinking water treatment, greenhouse gas reduction, pollution prevention, and water quality protection). EPA will use the protocols to objectively evaluate a wide variety of environmental technologies so that purchasers and permittees will have an independent and credible assessment of the technologies they are buying or permitting. EPA is also developing

outcome-oriented goals and performance measures in these areas.

In FY 2002 the SAB issued 17 reports advising EPA on a broad range of scientific and technical issues.¹² One major report, *A Framework for Assessing and Reporting on Ecological Conditions*¹³ (<http://www.epa.gov/sab/fiscal02.htm>), provided guidance that contributed to the Agency's design of its report on the environment, which the Agency plans to release in draft during FY 2003. The SAB guidance highlighted EPA's emphasis on measuring the impacts of Agency programs through scientifically credible indicators, and on protecting ecological resources. Other SAB peer-reviewed reports addressed environmental agents and cross-media issues, such as the review of particulate matter (<http://www.epa.gov/sab/fiscal02.htm>) and the trichloroethylene health risk assessment¹⁴ (<http://www.epa.gov/sab/fiscal03.htm>). This last report will help EPA address an environmental contaminant affecting air, water, and multiple Superfund sites and improve the Agency's approach to several important areas in risk assessment, such as protection of children and other vulnerable populations, and cumulative risk.

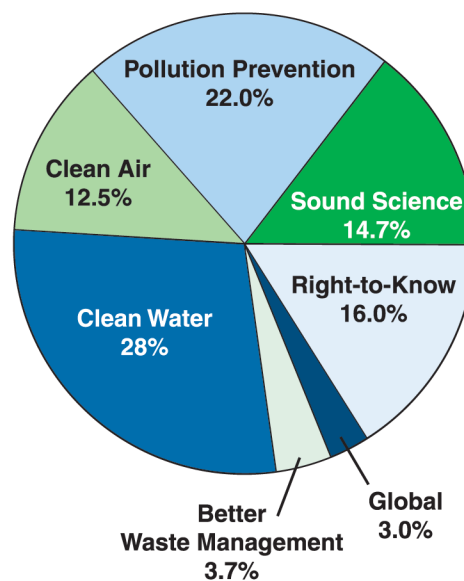
In FY 2002 the Regional Science and Technology organizations provided field sampling, analytical and data management support, and quality assurance to Agency programs nationwide and continued to expand the number of Centers of Applied Science (CASs). CASs support the development and application of new and innovative technologies by developing sampling, quality assurance, and analytical methodologies. These methodologies and technologies are shared both within EPA and with the Agency's partners. Some examples are (1) developing polymerase chain reaction as an analytical tool that would improve EPA's ability to detect protozoan parasites and other target organisms in drinking water and (2) developing a qualitative method of compound identification by X-ray diffraction, which, when combined with chemical analysis, has been valuable in determining the fate and transport of compounds in the environment. Advances in compound identification will help environmental decision

makers determine the most effective remedies at Superfund sites and assess water quality impacts from proposed or operating mineral resource facilities.

Greater Innovation

The Regional Geographic Initiative (RGI) Program (<http://www.epa.gov/regional/rgi.htm>) is one of the most effective tools to help EPA regions achieve a balance between responding to state and local needs and national priorities.¹⁵ In FY 2002 the 124 projects funded through the RGI Program provided EPA with flexibility to achieve environmental results by responding to strategic regional, state, and local priorities.¹⁶ EPA fostered regional solutions to cross-programmatic environmental problems, promoted innovation, built partnerships, developed holistic approaches and, of particular significance, leveraged additional funds from state, local, and non-governmental organization sources. For example, Region 3's "Livable Neighborhoods for Philadelphia" project engages citizens to promote the conservation of municipal resources and initiate actions that will result in increased neighborhood safety, environmental and human health protection, greening, and capacity building.¹⁷ Similarly, Region 7's "Kansas City WildLands" project involves citizen volunteers in conserving,

FY 2002 Distribution of Regional Geographic Initiative Projects Across Agency Goals



restoring, and protecting remnant natural communities threatened by overgrowth of woody vegetation, invasive species, and the loss of ecological integrity.¹⁸

In FY 2002 EPA also made significant progress toward incorporating innovative approaches to environmental management so that the Agency and its external partners can achieve greater and more cost-effective public health and environmental protection results. EPA produced new economic work products on environmental impacts related to specific air, water, and agricultural issues. Additional EPA-sponsored economic research studies begun in 2002 will improve Agency decision making in a lengthy list of specialized areas: children's health valuation, value of statistical life, water quality benefits valuation, cancer risk reduction benefits, host community compensation, and municipal solid waste landfills.

In FY 2002 EPA's industry sector-based program (<http://www.epa.gov/projectxl/2002state.htm>) developed projects to help enhance performance in five U.S. industries: metal finishing, metal foundries and die casting, meat processing, shipbuilding and ship repair, and specialty-batch chemical production.¹⁹ Such projects included sector-specific EMS templates, compliance assistance guides, and proposed RCRA regulatory changes to enhance waste recovery and reuse. Building on this program foundation, EPA will begin work with new industries to reduce regulatory and other barriers to improved environmental performance, while also providing tools and incentives to prompt many companies within each sector to develop environmental management systems. EPA outreach activities for small businesses and smart growth also expanded. The Agency responded to more than 15,000 calls on the Small Business Ombudsman Hotline for assistance regarding environmental regulations, and reached more than 10,000 individuals and organizations with information on Brownfields redevelopment through conference presentations and distribution of printed materials.²⁰

EPA selected three state projects to be funded under its FY 2002 State Innovation Pilot

Grant Program (<http://www.epa.gov/innovation/stategrants/>). Specifically, the Agency requested projects that test innovative permitting approaches using incentives to motivate "beyond-compliance" environmental performance, or that move whole sectors toward improved environmental performance and could show results in 2 to 3 years. EPA selected projects from the Arizona Department of Environmental Quality, the Delaware Department of Natural Resources and Environmental Control, and the Massachusetts Department of Environmental Protection. These projects include efforts to develop a Web-based system that will simplify and expedite storm water permitting and an innovative permitting approach for auto body repair shops that are facing new air quality requirements. EPA has approved the final work plan and made the award for Arizona—the time line for results for the innovative storm water permitting project is December 31, 2003. The Massachusetts project, watershed-based permitting in the Assabet River watershed, is in final negotiation and the time lines are not yet final; however, based upon their pre-proposal the Agency anticipates final results by March 2004. Similarly with the Delaware project, the development of an innovative air permitting program for the auto body sector, EPA is negotiating the final agreement and anticipates results by January 2005.

In April 2002 EPA issued its innovation strategy—"Innovating for Better Environmental Results: A Strategy to Guide the Next Generation of Innovation at EPA" (<http://www.epa.gov/innovation/strategy/>). This strategy reflects the Agency's commitment to explore new and creative ways of achieving cleaner air, purer water, and better-protected land. This vision for the future includes four primary elements: (1) strengthen EPA's innovation partnerships with states and tribes; (2) focus the Agency's innovation efforts on four priority environmental problems—smog, greenhouse gases, water quality, and water infrastructure; (3) make full use of technology, market-based incentives, environmental management systems, and measurable performance goals; and (4) make EPA's culture and management systems more

“innovation-friendly.” EPA is tracking progress under this strategy and issued its first progress report in November 2002.

Program Evaluation

In FY 2002 EPA completed the *Directory of Project Experiments and Results* (<http://www.epa.gov/projectxl/01report.htm>), which summarizes progress in meeting commitments and the unique issues and challenges in achieving the innovations for 51 innovation pilots under Project XL (eXcellence and Leadership). Each of the 51 projects has made progress in meeting commitments outlined in the formal Final Project Agreements. For the 19 projects that reported environmental progress during the period 1997 to 2001, cumulative environmental benefits accrued in a variety of areas. For example, XL projects cumulatively eliminated 28,319 tons of emissions of criteria air pollutants (NO_x, SO_x, carbon monoxide, particulate matter) and recycled 20,540 tons of solid waste. The report includes the cumulative and individual environmental results of projects that reported environmental data for the period 1997 to 2001. The Agency uses these data to determine opportunities for successful innovations and lessons learned to be applied to broader system change. For example, the results from the International Paper project in Jay, Maine, clarifies the application of new effluent technologies and will inform EPA’s future rulemaking regarding chemical oxygen demand and color at pulp and paper mills.

In FY 2002 EPA also issued the report *Mid-Term Evaluation: Piloting Superior Environmental Performance in Labs*, which presents lessons learned from the unique approach to laboratory management being tested by Project XL’s New England Labs innovation pilot at Boston College, the University of Massachusetts-Boston, and the University of Vermont. The report explains the environmental results of an approach that harmonizes Occupational Safety and Health Administration and Resource Conservation and Recovery Act requirements by using performance-based criteria for managing laboratory waste under an Environmental Management Plan tailored to each

institution. EPA is considering how the results of this evaluation should be incorporated into a proposed rulemaking.

STATE AND TRIBAL PARTNER CONTRIBUTIONS

State Contributions

The Nation’s 24 coastal states and Puerto Rico are partnering with EPA’s National Coastal Assessment (NCA) Program to build the scientific basis for representative cost-effective monitoring of conditions and trends in the country’s estuaries. State participation is essential to the success of the NCA Program to ensure that each state’s monitoring needs, as well as regional and national needs, are met. The states’ participation throughout the process provides important feedback on the appropriateness of the NCA Program for assessing their resources. This EPA-state collaboration has developed a compatible probabilistic design and a common set of survey indicators that measure factors such as water quality, sediment quality, and the quality of living resources. Each participating state employs this design and a set of core indicators to conduct the survey and assess the condition of its coastal resources. The information from these estimates can then be aggregated to assess conditions at the regional, biogeographical, and national levels. In conducting this joint coastal monitoring and assessment program, the coastal states and Puerto Rico are providing about 50 percent of total costs; EPA contributes the remaining half. All of the participating states either are evaluating or have already adopted for the long term this new and cost-effective approach to monitoring their coastal resources.

Under EPA’s innovation strategy, one of the primary goals is to work more closely with states to align Agency innovation priorities and look for collaborative opportunities. In FY 2002 the Environmental Results Program (ERP), an innovation initiative developed by EPA and Massachusetts, grew to include Rhode Island, Florida, Maryland, Tennessee, and the District of Columbia. The initiative seeks to cost-effectively

improve the environmental results of whole small business sectors through the use of linked regulatory tools. These tools educate small businesses about their environmental impacts and obligations, allow businesses to self-evaluate and certify compliance, and allow agencies to track environmental performance. ERP projects now cover several business sectors—printing, photo processing, dry cleaning, auto repair shops, auto salvage yards, auto body shops, and

underground storage tanks—in addition to the cross-sector initiative for new industrial boilers.

ASSESSMENT OF IMPACTS OF FY 2002 PERFORMANCE ON FY 2003 ANNUAL PERFORMANCE PLAN

There are no changes to FY 2003 APGs based on results of FY 2002 performance.

Goal 8: Sound Science

Summary of FY 2002 Annual Performance Goals

3 Goals Met

0 Goals Not Met

0 Data Lags

A description of the quality of the data used to measure EPA's performance can be found in Appendix B.

FY 2002 Obligations (in thousands):

EPA Total: \$9,447,202
Goal 8: \$304,325
Goal 8 Share of Total: 3.2%

FY 2002 Costs (in thousands):

EPA Total: \$7,998,422
Goal 8 Costs: \$325,622
Goal 8 Share of Total: 4.1%

Refer to page I-13 of the Overview (Section I) for an explanation of difference between obligations and costs.
Refer to page IV-11 of the Financial Statements for a consolidated statement of net cost by goal.

Annual Performance Goals (APG) and Measures FY 1999–FY 2002 Results

Strategic Objective: Provide the Scientific Understanding to Measure, Model, Maintain, and/or Restore, at Multiple Spatial Scales, the Present and Future Integrity of Highly Valued Ecosystems.

FY 2002 Cost (in thousands): \$112,647 (34.6% of FY 2002 Goal 8 Total Costs)

Progress Toward Strategic Objective: In FY 2002 EPA produced an analysis of data from streams and lakes in the Northeast, Mid-Atlantic, and upper Midwest that provides evidence that controls on acid deposition, taken in response to the Clean Air Act (CAA) Amendments of 1990, are working. Determining the results of environmental management policies such as these will in turn increase EPA's ability to maintain and restore the integrity and sustainability of highly valued ecosystems.

APG 55	Integrated Ecosystem Modeling	Planned	Actual
FY 2002	Produce a report on trends in acid deposition and the acidity of lakes and streams to assess progress toward reducing the impacts of acid rain. Goal Met.	1	1

FY 2002 Results: EPA produced a report on trends in acid deposition and the acidity of lakes and streams to assess progress toward reducing the impacts of acid rain. This report analyzed some of the key mechanisms preventing recovery in critical regions of the United States and will provide crucial information on the effectiveness of Title IV of the CAA Amendments of 1990. EPA will use the results in its biennial report to Congress on the Acid Rain Program.

Strategic Objective: Improve the Scientific Basis to Identify, Characterize, Assess, and Manage Environmental Hazards and Exposures That Pose the Greatest Health Risks to the American Public By Developing Models and Methodologies to Integrate Information About Exposures and Effects From Multiple Pathways. This Effort Includes Focusing on Risks Faced by Susceptible Populations, Such As People Differentiated By Life Stage (e.g., Children and the Elderly) and Ethnic/Cultural Background.

FY 2002 Cost (in thousands): \$50,450 (15.5% of FY 2002 Goal 8 Total Costs)

Progress Toward Strategic Objective: In FY 2002 EPA completed a framework for conducting risk assessments for a variety of multimedia, multipathway pollutants of concern to the Agency. This framework will provide the Agency with a more complete understanding of the relationships between sources, exposures, doses, and effects and will enable EPA to conduct more accurate and reliable risk assessments. The Agency also continued to evaluate the exposures and effects of environmental contaminants affecting susceptible subpopulations and produced a series of reports on potential methods to assess pesticide-related health impacts in young children. These research efforts strengthened the Agency's ability to effectively prevent and/or manage risks to human health.

Strategic Objective: Enhance EPA's Capabilities to Anticipate, Understand, and Respond to Future Environmental Development and Conduct Research in Areas That Combine Human Health and Ecological Considerations.

FY 2002 Cost (in thousands): \$50,345 (15.4% of FY 2002 Goal 8 Total Costs)

Progress Toward Strategic Objective: FY 2002 research efforts yielded protocols for use in EPA's endocrine disruptor (EDC) screening and testing program mandated under the Food Quality Protection Act and the Safe Drinking Water Act Amendments of 1996. EPA also examined the application of various technologies to effectively reduce and/or prevent environmental and human exposure to EDCs. Additional research focused on improving methods for quantifying mercury emissions from man-made sources, as well as enhancing EPA's ability to mitigate and prevent harm caused by biological agents. These research efforts help EPA anticipate and identify environmental changes before they affect human health and the environment.

Strategic Objective: Provide Tools and Technologies to Improve Environmental Systems Management While Continuing to Prevent and Control Pollution and Reduce Human Health and Ecological Risks Originating From Multiple Economic Sectors.

FY 2002 Cost (in thousands): \$57,301 (17.6% of FY 2002 Goal 8 Total Costs)

Progress Toward Strategic Objective: In FY 2002 EPA provided, to environmental decision makers, improved pollution prevention tools to estimate the potential environmental impact of chemical process designs, to delay resistance in target insects to toxins in transgenic crops, and to evaluate inhalation impacts of metal finishing facilities on workers and nearby residents. In addition, through the Environmental Technology Verification (ETV) program, EPA produced 20 protocols for verifying innovative environmental technologies. These research efforts strengthen the ability of the Agency and its customers to prevent and/or mitigate risks to human health and the environment.

APG 56	Pollution Prevention (P2) Tools and Methodologies	Planned	Actual
FY 2002	Improve P2 tools for the industrial sector and other sectors by providing updated/new methods and approaches to help users simulate product, process or system redesign and evaluate resulting pollution levels, impacts and costs. Goal Met.		
	<u>Performance Measures</u>		
	- Enhance the Waste Reduction Algorithm environmental impact assessment tool used to design or retrofit chemical processes with: (1) a better assessment methodology, and (2) new features (costing).	1 method	1 method
	- Prepare a pest resistance management framework to prolong the effectiveness of genetically-modified corn pesticide characteristics for the Office of Pesticide Programs during product registration.	1 protocol	1 protocol
	- Provide a PC-based tool for use by EPA and the metal finishing sector in evaluating exposure and inhalation health risks to workers and residents living near metal finishing facilities.	1 risk tool	1 risk tool

FY 2002 Result: This APG provides tools that facilitate the use of preventative approaches to solve pollution problems posing the greatest risks to human health and the environment. Specifically, EPA improved P2 tools for the industrial sector and other sectors by providing updated/new methods and approaches to help users simulate product, process, or system redesign and evaluate resulting pollution levels, impacts, and costs. EPA successfully completed a variety of independent tools, including: (1) the Waste Reduction (WAR) Algorithm for process simulators, (2) the pest resistance management framework and genetically modified corn, and (3) computer-based evaluation of exposure and risk in metal finishing facilities. These low cost and easy to use products will enable EPA, regions, states, municipalities, and businesses to find cost-effective ways to reduce pollution at the source and potentially lead to improved environmental and human health.

APG 57	New Technologies	Planned	Actual
FY 2002	Formalize generic testing protocols for technology performance verification, and provide additional performance verifications of pollution prevention, control and monitoring technologies in all environmental media. Goal Met.		
	<u>Performance Measure</u>		
	- Complete 20 stakeholder approved and peer-reviewed test protocols in all environmental technology categories under Environmental Technology Verification (ETV), and provide them to testing organizations world-wide.	20	20
FY 2001	<i>Develop, evaluate, and deliver technologies and approaches that eliminate, minimize, or control high risk pollutants from multiple sectors. Emphasis will be placed on preventive approaches for industries and communities having difficulty meeting control/emission/effluent standards. Goal Not Met.</i>		
	<u>Performance Measure</u>		
	- Deliver a Report to Congress on the status and effectiveness of the ETV Program during its first 5 years.	1	0
FY 2000	<i>Complete development of one or more computer-based tools which simulate product, process, or system design changes, and complete proof-of-process structure for one or more generic technologies (applicable to more than one environmental problem) to prevent or reduce pollution in chemicals and industrial processes. Goal Met.</i>		
	<u>Performance Measures</u>		
	- Complete development of PARIS II Software tool to design environmentally benign solvents, and development and integration of WAR Algorithm into commercially available chemical process simulator.	9/30/00	9/30/00
	- Complete Beta testing of a decision support tool for life-cycle analyses of municipal waste management options.	9/30/00	9/30/00

FY 2002 Result: EPA formalized generic testing protocols for technology performance verification, and provided additional performance verifications of pollution prevention, control, and monitoring technologies in all environmental media. EPA successfully completed 20 stakeholder approved and peer-reviewed testing protocols for commercial-ready environmental technologies in six different categories

(environmental monitoring, air pollution control, drinking water treatment, greenhouse gas reduction, pollution prevention, and water quality protection). In addition, 30 verifications of commercial-ready environmental technologies were completed. These protocols and verifications are intended to provide decision making advancements and facilitate understanding by purchasers, permittees, and vendors of a variety of environmental technologies.

Strategic Objective: Increase Partnership-Based Projects With Counties, Cities, States, Tribes, Resource Conservation Districts, and/or Bio-regions, Bringing Together Needed External and Internal Stakeholders, and Quantify the Tangible and Sustainable Environmental Results of Integrated, Holistic, Partnership Approaches.

FY 2002 Cost (in thousands): \$12,556 (3.9% of FY 2002 Goal 8 Total Costs)

Progress Toward Strategic Objective: In FY 2002 under the Regional Geographic Initiatives Program, EPA supported projects that focus resources on problems that are not being addressed, wholly or in part, by existing national environmental programs because of their unique geographic or cross-media nature. Projects are accomplished by working in partnership with states, local governments, and the private sector. All of the projects support one or more of EPA's environmental goals. EPA has analyzed possible methods of identifying and quantifying the gains in environmental outcomes associated with the projects and has linked each of the projects to the Agency goal and objective it supports.

Strategic Objective: Incorporate Innovative Approaches to Environmental Management into EPA Programs, So That EPA and External Partners Achieve Greater and More Cost-Effective Public Health and Environmental Protection.

FY 2002 Cost (in thousands): \$35,741 (11% of FY 2002 Goal 8 Total Costs)

Progress Toward Strategic Objective: In FY 2002 EPA made significant progress toward incorporating innovative approaches to environmental management so that the Agency and its external partners can achieve greater and more cost-effective public health and environmental protection results. EPA's industry sector-based programs surpassed environmental performance targets, while outreach activities for small businesses and smart growth expanded. EPA responded to more than 15,000 calls on the Small Business Ombudsman Hotline and reached more than 10,000 individuals and organizations with information on Brownfields redevelopment through conference presentations and distribution of printed materials. Through a successful competitive process, EPA awarded three Innovation Grants to state agencies for the purpose of assisting the states in solving key environmental problems through innovative methods.

Strategic Objective: Conduct Peer Reviews and Provide Other Guidance to Improve the Production and Use of the Science Underlying Agency Decisions.

FY 2002 Cost (in thousands): \$3,039 (.9% of FY 2002 Goal 8 Total Costs)

Progress Toward Strategic Objective: In FY 2002 the EPA Science Advisory Board (SAB) completed 17 reports advising the Agency on a broad range of scientific and technical issues. Four reports provided guidance on protecting ecological resources. One report, *A Framework for Assessing and Reporting on Ecological Condition*, provided guidance that EPA is using to design its forthcoming report on the state of the environment. The SAB's guidance not only helped to heighten EPA's emphasis on measuring the impacts of Agency programs through scientifically credible indicators, but also affected the Agency's plans to emphasize protection of ecological resources in the forthcoming report.

Strategic Objective: Demonstrate Regional Capability to Assist Environmental Decision Making By Assessing Environmental Conditions and Trends, Health and Ecological Risks, and the Environmental Effectiveness of Management Action in Priority Geographic Areas.

FY 2002 Cost (in thousands): \$3,543 (1.1% of FY 2002 Goal 8 Total Costs)

Progress Toward Strategic Objective: The Regional Science & Technology (RS&T) organizations support EPA's air, water, waste, and toxic substances programs by providing field sampling, analytical and data management support, and quality assurance to Agency programs nationwide. Regions have developed special capabilities and expertise (Centers of Applied Science) based on unique geographic and demographic issues. Centers have been designated in the areas of ambient air monitoring—environmental biology, chemistry, and microbiology—and analytical pollution prevention methodologies. The RS&T organizations continue to strengthen their operations by implementing Corrective Action Plans in response to Laboratory Assessments of both internal quality system reviews and external technical systems audits (eight assessments completed). Quality assurance programs in the EPA regions ensure the integrity of environmental data by overseeing management of monitoring programs, approving data collection activity plans, and evaluating monitoring and laboratory practices.

Prior Year Annual Performance Goals Without Corresponding FY 2002 Goals
(Actual Performance Data Available in FY 2002 and Beyond)

		Planned	Actual
FY 1999	Develop and verify innovative methods and models for assessing the susceptibilities of population to environmental agents, aimed at enhancing risk assessment and management strategies and guidelines.		target year is FY 2008

Goal 8 - Sound Science

FY 2001 Annual Performance Goals (No Longer Reported for FY 2002)

Establish baseline conditions from which changes, and ultimately trends, in the ecological condition of the nation's estuaries can be confidently documented, and from which the results of environmental management policies can be evaluated at regional scales.

EPA will implement significant improvements to core Agency functions identified as high environmental or economic impact identified during FY 2000 priority setting (Project eXcellence and Leadership—XL).

Notes:

1. J.L. Stoddard, J.S. Kahl, F.A. Daviney, D.R. DeWalle, C.T. Driscoll, A.T. Herlihy, J.H. Kellogg, P.S. Murdoch, J.R. Webb, and K.E. Webster, *Response of Surface Water Chemistry to the Clean Air Act Amendments of 1990* (Research Triangle Park, NC: U.S. EPA, Office of Research and Development, National Health Environmental Effects Research Laboratory, in clearance).
2. J. Buzzard, V. Moser, and S. Padilla, Comparison of the role of esterases in the differential age-related sensitivity to chlorpyrifos and methamidophos, *Neurotoxicology* 21 (2001):49–56.
3. U.S. EPA, Office of Research and Development, National Risk Management Research Laboratory, *Control of Mercury Emissions From Coal-Fired Electric Utility Boilers: Interim Report*, EPA-600/R-01-109 (Research Triangle Park, NC: U.S. EPA, Office of Research and Development, National Risk Management Research Laboratory, 2002).
4. U.S. EPA, Office of Research and Development, National Center for Environmental Assessment, *Metal Finishing Facility Risk Screening Tool (MFFRST): Technical Documentation and User's Guide*, EPA/600/R-01/057 (Washington, DC: U.S. EPA, Office of Research and Development, National Center for Environmental Assessment, 2001). ORD's Environmental Technology Verification Program protocols are available only through the Internet at <http://www.epa.gov/etv/verifications/protocols/index.html>.
5. J.L. Stoddard, J.S. Kahl, F.A. Daviney, D.R. DeWalle, C.T. Driscoll, A.T. Herlihy, J.H. Kellogg, P.S. Murdoch, J.R. Webb, and K.E. Webster.
6. U.S. EPA, Science Advisory Board, Integrated Human Exposure Committee, *An SAB Advisory: The National Human Exposure Assessment Survey (NHEXAS) Pilot Studies*, EPA-SAB-IHEC-ADV-99-004 (Washington, DC: U.S. EPA, 1999).
7. L.J. Bonanno, N.C.G. Freeman, M. Greenberg, and P.J. Liroy, Multivariate Analysis on Levels of Selected Metals, Particulate Matter, VOC, and Household Characteristics and Activities from the Midwestern States NHEXAS, *Appl. Occup. Environ. Hygiene* 16(9, 2001):859–874. C.A. Clayton, E. Pellizzari, and J. Quackenboss, National Human Exposure Assessment Survey: Analysis of Exposure Pathways and Routes for Arsenic and Lead in EPA Region 5, *J. Expo. Anal. Environ. Epidemiol.* 12(1, 2002), 29–43. C.A. Clayton, E.D. Pellizzari, J.J. Quackenboss, and R.W. Whitmore, Distributions, Associations, and Partial Aggregate Exposure of Pesticides and Polynuclear Aromatic Hydrocarbons in the Minnesota Childrens Pesticide Exposure Study (MNCPEs), *J. Expo. Anal. Environ. Epidemiol.*, in press. D.E. Camann, D.L. MacIntosh, Y. Pang, and P.B. Ryan, Analysis of Aggregate Exposure to Chlorpyrifos in the NHEXAS—Maryland Investigation, *Environ. Health Perspect.* 110(3, 2002):235–240. The National Human Exposure Assessment Survey (NHEXAS) database is available through EPA's Environmental Information Management System (EIMS) on the Human Exposure Database System (HEDS) web site at <http://www.epa.gov/heds/>.
8. The Food Quality Protection Act of 1996, H.R. 1627, Public Law 104-170.
9. Safe Drinking Water Act Amendments of 1996, Public Law 104-182.
10. U.S. EPA, Office of Research and Development, National Risk Management Research Laboratory, *Control of Mercury Emissions from Coal-Fired Electric Utility Boilers: Interim Report*, EPA-600/R-01-109 (Cincinnati, OH: U.S. EPA, Office of Research and Development, National Risk Management Research Laboratory, 2002). Available at <http://www.epa.gov/appcdwww/aptb/>.
11. U.S. EPA, Office of Air and Radiation, *The Mercury White Paper* (2000). Available at <http://www.epa.gov/ttncaaa1/t3/meta/m22914.html>.
12. The SAB Report can be found on-line at <http://www.epa.gov/sab>. The reports advising EPA in the SAP are as follows:

The Science to Achieve Results (STAR) Water and Watersheds Grants Program: An EPA Science Advisory Board Review, EPA-SAB-EPEC-02-001 (2001).

Water Quality and Pollution Prevention Multiyear Plans: An SAB Review, EPA-SAB-RSAC-02-003 (2001).

Review of the Office of Radiation and Indoor Air's Draft Methodology for Ranking Indoor Air Toxics, EPA-SAB-EHC/IHEC-02-004 (2001).

Planning for Ecological Risk Assessment: Developing Management Objectives: An SAB Report, EPA-SAB-EPEC-02-005 (2002).

Contaminant Candidate List Research Plan: An SAB Report, EPA-SAB-DWC-02-006 (2002).

FY 2003 Presidential Science and Technology Budget Request for the Environmental Protection Agency: An SAB Review, EPA-SAB-RSAC-02-007 (2002).

Interim Review of the Particulate Matter (PM) Research Centers of the USEPA: An EPA Science Advisory Board Report, EPA-SAB-EC-02-008 (2002).

A Framework for Assessing and Reporting on Ecological Conditions, EPA-SAB-EPEC-02-009 (2002).

A Framework for Assessing and Reporting on Ecological Conditions: Executive Summary, EPA-SAB-EPEC-02-009a (2002).

Overview of the Panel Formation Process at the Environmental Protection Agency Science Advisory Board, EPA-SAB-EC-02-010 (2002).

Review of the Agency's Draft Continuous Monitoring Implementation Plan: A Review by the Clean Air Scientific Advisory Committee, EPA-SAB-CASAC-LTR-02-001 (2002).

Review of the Southeastern Ecological Framework: An EPA Science Advisory Board Report, EPA-SAB-EPEC-LTR-02-002 (2002).

Review of the Air Quality Criteria Document for Particulate Matter: Third External Review Draft, EPA 600/P-99/002aC & 002bC: A CASAC Review, EPA-SAB-CASAC-LTR-02-003 (2002).

NATA—Evaluating the National-Scale Air Toxics Assessment 1996 Data: An SAB Advisory, EPA-SAB-EC-ADV-02-001 (2002).

Review of the Agency's Draft Proposed Methodology for Particulate Matter Risk Analysis for Selected Urban Areas: An Advisory by the Clean Air Scientific Advisory Committee, EPA-SAB-CASAC-ADV-02-002 (2002).

Importance of Maintaining the Annual Pollution Abatement Cost and Expenditures (PACE) Survey, EPA-SAB-EEAC-COM-02-001 (2002).

Industrial Ecology: A Commentary by the EPA Science Advisory Board, EPA-SAB-EEC-COM-02-002 (2002).

EPA Science Advisory Board (SAB) Panel Formation Process: Immediate Steps to Improve Policies and Procedures—An SAB Commentary, EPA-SAB-EC-COM-02-003 (2002).

Agency's Proposed Methodology for Measuring Coarse Particulate Matter: A CASAC Notification of a Consultation, EPA-SAB-CASAC-CON-02-001 (2002).

Market Incentives: A SAB Notification of a Consultation, EPA-SAB-EEAC-CON-02-002 (2002).

An Approach to Developing a Research Agenda for Environmental Economics: An SAB Consultation, EPA-SAB-EEAC-CON-02-003 (2002).

13. *A Framework for Assessing and Reporting on Ecological Conditions*, EPA-SAB-EPEC-02-009, (2002).
14. *Review of the Air Quality Criteria Document for Particulate Matter: Third External Review Draft*, EPA 600/P-99/002aC & 002bC: A CASAC Review, EPA-SAB-CASAC-LTR-02-003 (2002). *Review of Draft Trichloroethylene Health Risk Assessment: Synthesis and Characterization: An SAB Report*, EPA-SAB-EHC-03-002 (2002).
15. U.S. EPA, Office of Congressional and Intergovernmental Relations, Office of Regional Operations. Available at <http://www.epa.gov/sab.html>.
16. U.S. EPA, Office of Regional Operations, 202-564-3100.
17. U.S. EPA, Region 3, Office of Policy and Management, 202-814-5200.
18. U.S. EPA, Region 7, Program Operations and Integration Staff, 913-551-7661.
19. U.S. EPA, Industry Sector Performance Program, 2002. Available at <http://www.epa.gov/sectors>.
20. The figure of 10,000 individuals and organizations was arrived at through an internal analysis conducted by the Development, Community, and Environment Division of EPA's Office of Policy, Economics, and Innovation.